

Ivo BUTTINONI

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NATIONALITY: ITALIAN



SUMMARY

I lead the Institute of Experimental Colloidal Physics at Heinrich-Heine University in Düsseldorf, Germany. The Institute was established in April 2020 following my appointment as Junior Professor.

My research interests focus on experimental techniques applied to **Soft Matter** and **Colloidal Physics**. I presented my results in **16 peer-reviewed publications** (>1000 citations) and at several international conferences. My **goals** are to challenge the state-of-the-art of my research field, develop novel scientific ideas and establish myself as an internationally-recognised team leader.

EDUCATION

- 2004 – 2007 BSc. degree in *Energy Engineering*, Faculty of Industrial Engineering, Politecnico di Milano, Milano, Italy.
Thesis: Applications of photovoltaic cells.
Advisor: Dr. Maurizio Delfanti.
- 2007 – 2009 MSc. degree in *Nuclear Engineering*, Faculty of Industrial Engineering, Politecnico di Milano, Milano, Italy.
Thesis: HGMS methods applied to crude oil Pickering emulsions.
Advisor: Prof. Dr. Roberto Piazza.
- 2010 – 2013 PhD in *Physics*, Department of Physics, Universität Stuttgart, Stuttgart, Germany.
Thesis: Self-propelled particles driven by light.
Advisor: Prof. Dr. Clemens Bechinger. Website: <https://www.bechinger.uni-konstanz.de/>.

TRAINING COURSES (SELECTED)

- 2011 “Colloid Imaging, Glasses and Flow”, Training Course, Edinburgh, UK.
- 2011 “Microfluidics”, Training Course, Bordeaux, France.
- 2012 “Manipulation of Colloidal Particles with External Fields”, Training Course, Stuttgart, Germany.
- 2012 “Physics of Complex Colloids”, Summer School, Varenna, Italy.
- 2015 “Colloidal Suspension Rheology”, Training Course, Zürich, Switzerland.

PROFESSIONAL EXPERIENCE

- 2014 – 2017 Postdoctoral Fellow, Department of Materials, ETH Zürich, Zürich, Switzerland.
Laboratory for Interfaces, Soft Matter and Assembly.
Group Leader: Prof. Dr. Lucio Isa. Website: <http://www.isa.mat.ethz.ch>.
- 2017 – 2020 Postdoctoral Fellow, Department of Chemistry, University of Oxford, Oxford, UK.
Physical and Theoretical Chemistry Laboratory, Oxford Colloid Group.
Group Leader: Prof. Dr. Roel Dullens. Website: <http://colloid.chem.ox.ac.uk>.
- 04/2020 – W1 Junior Professor with Tenure Track, Heinrich-Heine University, Düsseldorf, Germany.
Department of Physics, Institute of Experimental Colloidal Physics.
Website: <https://www.physik.hhu.de/institute-und-arbeitsgruppen.html>.

TEACHING EXPERIENCE

- 2012/13 “Gamma Radiation and Matter” and “Noise Fundamentals” tutorials.
- 2015/17 Lectures on Brownian dynamics for the “Fundamentals of Soft Materials” course.
- 2019 “Self-propelled colloids” – Invited lecturer at the Bad Honnef Physics School.
- 2020 – “Active Soft Matter” – Journal Club for MSc. students.

- 2020 – “Experimental Colloidal Physics” – Course for MSc. Physics students.
2021 – “Phoretic and Autophoretic Transport” – Invited lecturer Course at the ITN Experimental Active Matter Training.

SUPERVISING EXPERIENCE (SELECTED)

- 2010 – 2013 Felix Kümmel (MSc. Student).
2013 – 2017 Kilian Dietrich (PhD Student), Mathias Steinacher (MSc. Student), Hendrik Spanke (MSc. Student), Damian Renggli (MSc. Student).
2017 – 2019 Miranda Bell-Davies (PhD Student), Muhammad N. Sulaiman (MSc. Student), James Marsh (MSc. student).
2020 – Virginia Carrasco Fadanelli (postdoc)

AWARDS

- 2014 ETH Zürich postdoctoral fellowship - European Union's Seventh Framework Programme
2015 ETH Research Grant (in collaboration with Prof. Lucio Isa). *Amount awarded: 220.000 CHF*
2015 ETH Scientific Equipment Grant. *Amount awarded: 35.000 CHF*
2017 Marie Skłodowska-Curie Individual Fellowship (IF). *Amount awarded: 180.000 EUR*
2017 SNSF Advanced Postdoc Mobility. *Amount awarded: 52.500 CHF*
2021 Emerging Leader, J. Phys. Mater.

EDITORIAL REVIEW

- 2016 – Referee for AIP, RSC, APS, IOP and Nature Journals.
Referee for scientific grants, including ERC Grants.
2019 – Member of the Advisory Board of *Journal of Physics: Condensed Matter*.
2019 – Topic Editor for *MDPI Materials*.

PEER-REVIEWED PAPERS

- Volpe, G., [Buttinoni, I.](#), Vogt, D., Kümmerer, H., & Bechinger, C. Microswimmers in patterned environments. *Soft Matter* **7**, 8810-8815 (2011). DOI: [10.1039/C1SM05960B](https://doi.org/10.1039/C1SM05960B)
- [Buttinoni, I.](#), Volpe, G., Kümmel, F., Volpe, G., & Bechinger, C. Active Brownian motion tunable by light. *J. Phys.: Condens. Matter*, **24**, 284129 (2012). DOI: [10.1088/0953-8984/24/28/284129](https://doi.org/10.1088/0953-8984/24/28/284129)
- Kümmel, F., ten Hagen, B., Wittkowski, R., [Buttinoni, I.](#), Eichhorn, R., Volpe, G., Löwen, H., & Bechinger, C. Circular motion of asymmetric self-propelling particles. *Phys. Rev. Lett.* **110**, 198302 (2013). DOI: <https://doi.org/10.1103/PhysRevLett.110.198302>
- [Buttinoni, I.](#), Bialkè, J., Kümmel, F., Löwen, H., Bechinger, C., & Speck, T. Dynamical clustering and phase separation in suspensions of self-propelled colloidal particles. *Phys. Rev. Lett.* **110**, 238301 (2013). DOI: <https://doi.org/10.1103/PhysRevLett.110.238301>
- [Buttinoni, I.](#), Zell, Z. A., Squires, T. M., & Isa, L. Colloidal binary mixtures at fluid-fluid interfaces under steady shear. *Soft Matter* **11**, 8313-8321 (2015). DOI: [10.1039/C5SM01693B](https://doi.org/10.1039/C5SM01693B)
- Ni, S., Leemann, J., [Buttinoni, I.](#), Isa, L., & Wolf, H. Programmable colloidal molecules from sequential capillarity-assisted particle assembly. *Science Advances* **2**(4), e1501779 (2016). DOI: [10.1126/sciadv.1501779](https://doi.org/10.1126/sciadv.1501779)
- [Buttinoni, I.](#), Steinacher, M., Spanke, H., Pokki, J., Bahmann, S., Nelson, B., Foffi, G. & Isa, L. Colloidal polycrystalline monolayers under oscillatory shear. *Phys. Rev. E* **95**, 012610 (2017). DOI: <https://doi.org/10.1103/PhysRevE.95.012610>
- Ni, S., Marini, E., [Buttinoni, I.](#), Wolf, H., & Isa, L. Hybrid colloidal microswimmers through sequential capillary assembly. *Soft Matter* **13**, 4252-4259 (2017). DOI: [10.1039/C7SM00443E](https://doi.org/10.1039/C7SM00443E)
- Dietrich, K., Renggli, D., Zanini, M., Volpe, G., [Buttinoni, I.](#) & Isa, L. Two-dimensional nature of the active Brownian motion of catalytic microswimmers at solid and liquid interfaces. *New J. Phys.* **19**, 065008 (2017). DOI: <https://doi.org/10.1088/1367-2630/aa7126>
- Ni, S., [Buttinoni, I.](#), Wolf, H., & Isa, L. Hybrid colloids produced by sequential capillarity-assisted particle assembly: A new path for complex microparticles. *Chimia* **71**(6), 349-353 (2017). DOI: <https://doi.org/10.2533/chimia.2017.349>
- Isa, L., [Buttinoni, I.](#), Fernandez Rodriguez, M. A., & Vasudevan, S. Two-dimensional assemblies of soft repulsive colloids confined at fluid interfaces. *EPL* **119**(2): 26001 (2017). DOI: [10.1209/0295-5075/119/26001](https://doi.org/10.1209/0295-5075/119/26001)

12. [Buttinoni, I.](#), Lin, W., Cha, J., Job, S., Daraio, C. & Isa, L.
Direct observation of impact propagation and absorption in aqueous colloidal monolayers.
PNAS. **114**.46: 12150-12155 (2017). DOI: <http://www.pnas.org/cgi/doi/10.1073/pnas.1712266114>
13. Dietrich, K., Volpe, G., Sulaiman, M. N., Renggli, D., [Buttinoni, I.](#) & Isa, L.
Active atoms and interstitials in two-dimensional colloidal crystals.
Phys. Rev. Lett. **120**, 268004 (2018). DOI: <https://doi.org/10.1103/PhysRevLett.120.268004>
14. Dietrich, K., Jaensson, N., [Buttinoni, I.](#), Volpe, G., & Isa, L.
Microscale Marangoni Surfers.
Phys. Rev. Lett. **125**, 098001 (2020). DOI: <https://doi.org/10.1103/PhysRevLett.125.098001>
15. Fernandez-Rodriguez, M. A., Grillo, F., Alvarez, L., Rathlef, M., [Buttinoni, I.](#), Volpe, G. & Isa, L.
Feedback-controlled active Brownian colloids with space-dependent rotational dynamics.
Nat. Commun. **11**, 4223 (2020). DOI: <https://doi.org/10.1038/s41467-020-17864-4>
16. [Buttinoni, I.](#) & Dullens, R. P. A.
Mechanical properties of colloidal crystals at fluid interfaces.
J. Phys. Mater. **4** 025001 (2021). DOI: <https://doi.org/10.1088/2515-7639/abd019>.

RESEARCH EXPERIENCE

- 2010 – [Active Brownian motion](#)
Topics: Synthetic active colloids, active particles in complex environments, dense active suspensions, active crystals.
- 2012 – [Anisotropic colloids](#)
Topics: patchy particles, asymmetric polymer particles, colloidal molecules.
- 2014 – [Interfacial microrheology](#)
Topics: liquid interfaces, colloidal crystals and glasses, shear response.
- 2012 – [Colloids with inertia](#)
Topics: colloidal crystals, elasto-hydrodynamic, impacts in colloidal structures.
- 2014 – [Driven colloids](#)
Topics: Mechanical deformation of colloidal crystals and glasses, stochastic thermodynamics, optical landscapes.

REFEREES

Prof. Dr. Clemens Bechinger. Universität Stuttgart, Stuttgart, Germany. Email: clemens.bechinger@uni-konstanz.de.
 Prof. Dr. Lucio Isa. ETH Zürich, Zürich, Switzerland. Email: lucio.isa@mat.ethz.ch.
 Prof. Dr. Roel Dullens. University of Oxford, Oxford, UK. Email: roel.dullens@chem.ox.ac.uk.